

WHAT IS CLAIMED IS:

1        1.    A method of operating a communications system  
2        including an edge router, the method comprising:  
3                operating said edge router to perform the steps of:  
4                        generating, in a forwarding table, a MAC address  
5        forwarding table entry from a MAC address included in a  
6        headers of a frame received by said edge router;  
7                monitoring a communications session between a  
8        device on a network which uses MAC addresses with a server  
9        responsible for assigning IP addresses to detect assignment  
10       of an IP address corresponding to a MAC address provided in  
11       a data portion of a message from said device; and  
12                upon detecting assignment of an IP address  
13       corresponding to a MAC address provided in a data portion  
14       of said message, creating an entry in an address resolution  
15       table associating an assigned IP address with said MAC  
16       address provided in the data portion of said message.

1        2.    The method of claim 1, further comprising:  
2                discarding IP packets corresponding to IP addresses  
3        for which a MAC address included in said address resolution  
4        table does not have a corresponding MAC address entry in  
5        said MAC address forwarding table.

1        3.    The method of claim 2, wherein Address Resolution  
2        Protocol is not used by said edge router.

1        4.    The method of claim 3, further comprising:

2       storing in said address resolution table aging  
3       information obtained from monitoring information associated  
4       with said IP address assignment.

1       5.    The method of claim 4, further comprising;  
2       operating said edge router to monitor for IP address  
3       release messages transmitted from said network to the  
4       server responsible for assigning IP addresses; and  
5       deleting, in response to detecting an IP address  
6       release message, an entry in said address forwarding table  
7       corresponding to an IP addresses included in said detected  
8       IP address release message.

1       6.    The method of claim 5, further comprising;  
2       operating said edge router to compare a MAC address  
3       included in the data portion of an IP address assignment  
4       request message to a MAC address included in the header of  
5       said IP address assignment request message.

1       7.    The method of claim 6, further comprising;  
2       generating a security alert signal in response to  
3       detecting a mismatch between the MAC address included in  
4       the data portion of said IP address assignment request  
5       message and said MAC address included in the header of said  
6       IP address assignment request message.

1       8.    The method of claim 1, further comprising:  
2       operating the edge router to transmit MAC address  
3       information obtained by accessing a forwarding table  
4       included in said edge router in response to a request for

5     MAC address information corresponding to an IP address  
6     assignment request.

1     9.    The method of claim 8, wherein the method further  
2     comprises:

3           operating said server to deny said IP address  
4     assignment request when said MAC address information  
5     obtained by accessing said forwarding table indicates a  
6     discrepancy between a MAC address included in the IP  
7     address assignment request and MAC address information  
8     included in said forwarding table.

1     10.   The method of claim 9, wherein said MAC address  
2     information obtained by accessing said forwarding table  
3     indicates that the MAC address is not included in the edge  
4     router forwarding table.

1     11.   A communication system comprising:  
2     an edge router including:

3           means for generating, in a forwarding table, a  
4     MAC address forwarding table entry from a MAC address  
5     included in a headers of a frame received by said edge  
6     router;

7           means for monitoring a communications session  
8     between a device on a network which uses MAC addresses with  
9     a server responsible for assigning IP addresses to detect  
10    assignment of an IP address corresponding to a MAC address  
11    provided in a data portion of a message from said device;  
12    and

13           means for creating an entry in an address  
14    resolution table associating an assigned IP address with

15 said MAC address provided in the data portion of said  
16 message upon detecting assignment of an IP address  
17 corresponding to a MAC address provided in a data portion  
18 of said message.

1 12. The communication system of claim 11, wherein support  
2 for Address Resolution Protocol is disabled in said edge  
3 router.

1 13. The communication system of claim 12, wherein said  
2 edge router further includes:  
3 means for discarding IP packets corresponding to IP  
4 addresses for which a MAC address included in said address  
5 resolution table does not have a corresponding MAC address  
6 entry in said MAC address forwarding table.

1 14. The communications system of claim 13, wherein said  
2 edge router further comprises:  
3 an address resolution table including IP address aging  
4 information obtained from monitoring information associated  
5 with said IP address assignment.

1 15. The communications system of claim 14, wherein said  
2 edge router further includes:  
3 means for monitoring for IP address release messages  
4 transmitted from said network to the server responsible for  
5 assigning IP addresses; and  
6 means for deleting, in response to detecting an IP  
7 address release message, an entry in said address  
8 forwarding table corresponding to an IP addresses included  
9 in said detected IP address release message.

1     16. The communications system of claim 15, wherein said  
2     edge router further comprises:

3         means for comparing a MAC address included in the data  
4     portion of an IP address assignment request message to a  
5     MAC address included in the header of said IP address  
6     assignment request message.

1     17. The communications system of claim 16, wherein said  
2     edge router further comprises:

3         means for generating a security alert signal in  
4     response to detecting a mismatch between the MAC address  
5     included in the data portion of said IP address assignment  
6     request message and said MAC address included in the header  
7     of said IP address assignment request message.

1     18. The communications system of claim 17, further  
2     comprising:

3         means for transmitting MAC address information  
4     obtained by accessing a forwarding table included in said  
5     edge router to said server in response to a request for MAC  
6     address information corresponding to an IP address  
7     assignment request.

1     19. The communications system of claim 18, wherein said  
2     MAC address information indicates whether or not a MAC  
3     address included in said IP address assignment request is  
4     present in a layer 2 forwarding table included in said edge  
5     router.

1     20. A machine-readable medium, comprising a set of  
2     machine-readable instructions for controlling a machine to  
3     perform the steps of:

4         generating, in a forwarding table, a MAC address  
5     forwarding table entry from a MAC address included in a  
6     headers of a frame received by said edge router;

7         monitoring a commutations session between a device on  
8     a network which uses MAC addresses with a server  
9     responsible for assigning IP addresses to detect assignment  
10    of an IP address corresponding to a MAC address provided in  
11    a data portion of a message from said device; and

12        upon detecting assignment of an IP address  
13    corresponding to a MAC address provided in a data portion  
14    of said message, creating an entry in an address resolution  
15    table associating an assigned IP address with said MAC  
16    address provided in the data portion of said message.